

[What is claimed is:]

1. An audio reproducing apparatus for amplifying an audio signal according to a pulse width modulation signal generated based on a digital audio signal and further filtering it so as to output an analog audio signal, the apparatus comprising:

a first control loop for feeding back a source voltage supplied to amplification means for amplifying the audio signal to a supply control portion of a power source for amplification and compensating a pulse width of a control signal for controlling supply of the power source for amplification; and

a second control loop for feeding forward the pulse width modulation signal to the supply control portion of the power source for amplification to compensate the pulse width of the control signal.

2. An audio reproducing apparatus for amplifying an audio signal according to a pulse width modulation signal generated based on a digital audio signal and further filtering it so as to output an analog audio signal, the apparatus comprising:

a first control loop for feeding back a source voltage supplied to amplification means for amplifying the audio signal to a supply control portion of a power source for amplification; and

a second control loop for generating a signal of approximately the same amplitude as the variation of the source voltage supplied to the amplification means and of an opposite phase based on the pulse width modulation signal and feeding

it forward to the supply control portion of the power source for amplification, and

controlling the supply of the power source for amplification by using the first and second control loops.

3. An audio reproducing apparatus comprising:

modulation means for performing a convert process based on modulation to an inputted digital audio signal and generating a pulse width modulation signal;

amplification means for amplifying an audio signal based on the pulse width modulation signal generated by the modulation means;

filter means for filtering a signal outputted from the amplification means and thereby generating an analog audio signal;

power source supply control means for controlling supply of a power source for amplification to the amplification means according to a predetermined control signal; and

compensation means for feedback-inputting the signal of the amplitude according to a source voltage supplied to the amplification means and generating and feedforward-inputting the signal of approximately the same amplitude as the variation of the source voltage supplied to the amplification means and of the opposite phase based on the pulse width modulation signal generated by the modulation means so as to compensate the predetermined control signal.

4. The audio reproducing apparatus according to claim 3,  
the power source supply control means is a switching regulator for exerting control to intermittently supply power from the power source for amplification to the amplification means according to the predetermined control signal; and  
the compensation means compensates the pulse width of the predetermined control signal based on the feedback-inputted and feedforward-inputted signals.

5. An audio reproducing apparatus comprising:

$\Delta\Sigma$  modulation means for performing a convert process based on  $\Delta\Sigma$  modulation to an inputted digital audio signal and generating a pulse width modulation signal;

amplification means for amplifying the audio signal based on the pulse width modulation signal generated by the  $\Delta\Sigma$  modulation means;

filter means for filtering a signal outputted from the amplification means and thereby generating an analog audio signal;

power source supply control means for controlling supply of a power source for amplification to the amplification means according to a predetermined control signal;

triangular wave generation means for generating a triangular wave signal based on a predetermined clock signal;

signal generation means for generating a signal of approximately the same amplitude as the variation of a source voltage supplied to the amplification means and of the opposite

phase based on the pulse width modulation signal generated by the  $\Delta\Sigma$  modulation means;

first comparison means for inputting to one input terminal the signal of the amplitude according to the source voltage supplied to the amplification means and inputting to the other input terminal the signal from the power source for amplification and the signal generated by the signal generation means so as to compare the two input signals and generate a difference signal; and

second comparison means for inputting to one input terminal the triangular wave signal generated by the triangular wave generation means and inputting to the other input terminal the difference signal outputted from the first comparison means so as to compare the two input signals, generate the predetermined control signal and supply it to the power source supply control means.

6. An audio reproducing apparatus comprising:

$\Delta\Sigma$  modulation means for performing a convert process based on  $\Delta\Sigma$  modulation to an inputted digital audio signal and generating a pulse width modulation signal;

amplification means for amplifying the audio signal based on the pulse width modulation signal generated by the  $\Delta\Sigma$  modulation means;

filter means for filtering a signal outputted from the amplification means and thereby generating an analog audio signal;

power source supply control means for controlling supply of a power source for amplification to the amplification means according to a predetermined control signal;

triangular wave generation means for generating a triangular wave signal based on a predetermined clock signal;

signal generation means for generating the signal of approximately the same amplitude as the variation of a source voltage supplied to the amplification means and of the opposite phase based on the pulse width modulation signal generated by the  $\Delta\Sigma$  modulation means;

first comparison means for inputting to one input terminal the signal of the amplitude according to the source voltage supplied to the amplification means and the signal generated by the signal generation means and inputting to the other input terminal the signal from the power source for amplification so as to compare the two input signals and generate a difference signal; and

second comparison means for inputting to one input terminal the triangular wave signal generated by the triangular wave generation means and inputting to the other input terminal the difference signal outputted from the first comparison means so as to compare the two input signals, generate the predetermined control signal and supply it to the power source supply control means.

7. An audio reproducing apparatus for amplifying an audio signal according to a pulse width modulation signal generated

based on a digital audio signal and further filtering it so as to output an analog audio signal, the apparatus characterized by detecting a source voltage supplied to amplification means for amplifying the audio signal and feeding it back to a supply control portion of a power source for amplification so as to compensate a pulse width of a control signal for controlling supply of the power source for amplification based on the source voltage fed back.

8. An audio reproducing apparatus for amplifying an audio signal according to a pulse width modulation signal generated based on a digital audio signal and further filtering it so as to output an analog audio signal, the apparatus characterized by generating a signal of approximately the same amplitude as the variation of a source voltage supplied to amplification means and of the opposite phase based on the pulse width modulation signal and feeding it forward to a supply control portion of the power source for amplification so as to compensate a pulse width of a control signal for controlling supply of the power source for amplification based on the signal fed forward.

9. An audio reproducing method for amplifying an audio signal according to a pulse width modulation signal generated based on a digital audio signal and further filtering it so as to output an analog audio signal, the method characterized by feeding back a signal of an amplitude according to a source

voltage supplied to amplification means for amplifying the audio signal to a supply control portion of a power source for amplification and generating the signal of approximately the same amplitude as the variation of the source voltage supplied to the amplification means and of the opposite phase based on the pulse width modulation signal and feeding it forward to the supply control portion of the power source for amplification so as to compensate the pulse width of a predetermined control signal used for controlling supply of the power source for amplification to the amplification means.

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